RESULTS WSDOT

MOVING WASHINGTON FORWARD

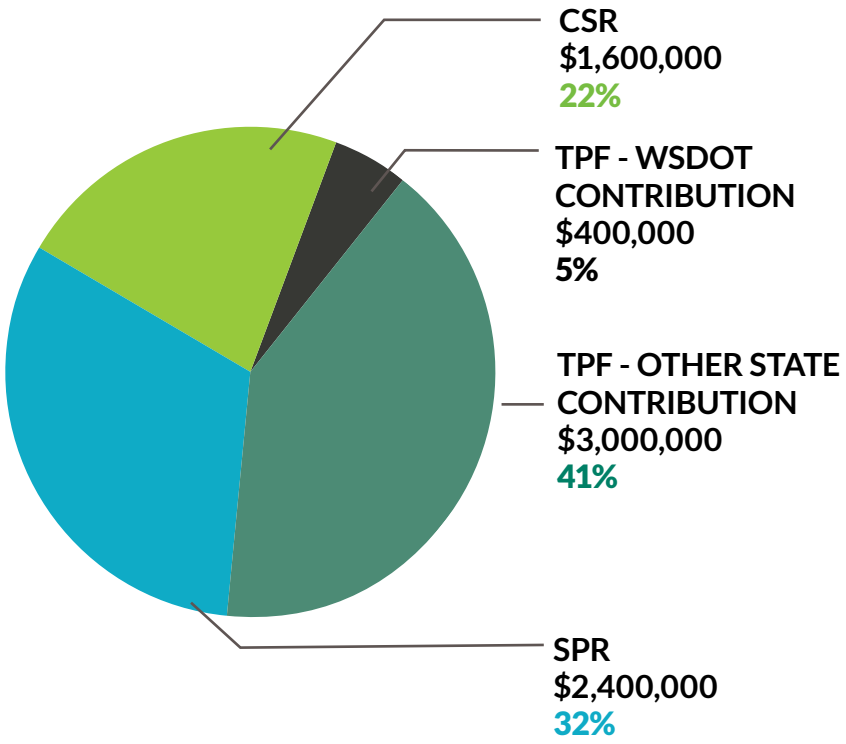
RESEARCH PORTFOLIO

2015 - 2017

Research is an important tool to support delivery of a transportation program that uses the best information, technologies and practices to serve Washington citizens and businesses. This portfolio presents ongoing research projects that are aligned with the Washington State Department of Transportation's (WSDOT) strategic plan *Results WSDOT*. These projects were inspired over the course of the last six years, and are in various stages of programming, scoping, data collection, analysis and development of final recommendations or products. These research projects, while organized by current strategic objectives, may also address other goals in the agency strategic plan.

TRANSPORTATION RESEARCH FUNDING

Research funding is provided by federal funds matched by 20% state funding through a formula based allocation in the State Planning and Research (SPR) program. The federal Transportation Pooled Fund (TPF) allows states to combine their funding to conduct research of common interest. WSDOT contributes about $400 thousand every biennium to various TPF projects valued at over $3 million in research investment. Other DOT programs may support research efforts—these are referrred to as Client Sponsored Research (CSR) projects. WSDOT is also the recipient of research grants provided by the Accelerated Innovation Program (AID) and Strategic Highway Research Program (SHRP). Partnerships with the University Transportation Centers—Pac Tran, Portland State, University of Alaska and others allows research funds to stretch even further.



GOAL 1 - STRATEGIC INVESTMENTS

Effectively manage system assets and multimodal investments on corridors to enhance economic vitality

CONSTRUCTION

Best Practices of Using Concrete for Wall Fascia and Slope Stabilization

Reviews the state of academic and industry knowledge to ensure the proper use of shotcrete for retaining wall fascia and slope stabilization. Shotcrete is increasingly being used for accelerated construction and rapid renewal, creating an urgent need to document its use for retaining wall fascia and slope stabilization by highway agencies, assess the condition of existing inventory, and identify best practices during various life-cycle stages of these structures.

RESEARCH TEAM: MARK GAINES | LU SAECHAO | PIZHONG QIAO, WSU
SCHEDULED COMPLETION: 2017

Project Management Strategies for Complex Projects (SHRP2 R-10)

Expands the three-dimensional (cost, schedule and technical requirements) analysis typically used by departments of transportation. Creates a model that facilitates project management in cost, schedule, technical, financial and context areas. This process enables a systematic management approach that speeds decision making, addresses complex issues and expedites government approvals for rapid renewal projects. WSDOT will implement this approach through a demonstration workshop on the Ferries $200M Multimodal Terminal at Colman Dock Project in Seattle. Based on the results, WSDOT will update its guidance documentation and policies on complex project delivery. WSDOT is also interested in developing a project delivery selection process using the tools from R10.

RESEARCH TEAM: MARK GAINES | LU SAECHAO | WSDOT IN HOUSE PROJECT
SCHEDULED COMPLETION: 2016

Project Inspection Using Mobile Technology (Headlight)

Examines the benefits of transitioning construction inspection duties and manual documentation functions to a mobile device data platform.

RESEARCH TEAM: CHRIS CHRISTOPHER | DEREK CASE | LU SAECHAO | PAVIA SYSTEMS
SCHEDULED COMPLETION: 2017

Simulation Software for Constructability Analysis (CA4PRS)

Provides a decision-making tool for the appropriate closure plan during the reconstruction of interstate pavements. CA4PRS identifies optimal rehabilitation strategies that balance the construction schedule with inconvenience to drivers and transportation agency costs. The program provides information to the planner/designer to optimally balance pavement design, construction constraints, traffic operations and transportation agency budget – especially during the planning and design of rehabilitation projects.

RESEARCH TEAM: JEFF UHLMEYER | LU SAECHAO | PAVIA SYSTEMS
SCHEDULED COMPLETION: 2016

BRIDGE

Evaluation Risk-Based Asset Management Systems for WSDOT Implementation

Evaluates various risk–based asset management systems to develop an agency asset management plan.

RESEARCH TEAM: TOM BAKER | LU SAECHAO | PI NOT SELECTED
SCHEDULED COMPLETION: TBD

Developing Connections for Longitudinal Joints between Deck Bulb Tees

Investigates ways of connecting the flanges of adjacent deck bulb tees by 1) developing a suitable UHPC mixture using locally sourced materials, and 2) investigating the connection details (for stiffness and strength in bending) for the deck bulb tee girders. This allows bridge decks to be created using precast deck members and avoids the need to form, reinforce and cast the deck on site, resulting in potential for considerable time and cost savings.

RESEARCH TEAM: BIJAN KHALEGHI | LU SAECHAO | PIZHONG QIAO (WSU) & JOHN STANTON (UW)
SCHEDULED COMPLETION: 2017

Developing Girder Strands into the Cap Beam for a Positive Moment Connection

Examines ways to develop a structurally efficient, easily constructible method for anchoring prestressing strands in the cap beam, and to verify by testing. To maximize the seismic resistance in the longitudinal direction of a bridge made from precast, prestressed concrete girders, the columns, the cap beam and the girders must be connected in such a way as to provide flexural (bending) resistance. A reliable and easy-to-construct method is needed for transferring the strand force into the joint. Available anchoring systems used to make the connection at this region of the bridge typically create congestion and pose constructability issues, particularly in skewed bridges.

RESEARCH TEAM: BIJAN KHALEGHI | LU SAECHAO | JOHN STANTON (UW) & MARC EBERHARD (UW)
SCHEDULED COMPLETION: 2016

Shear Design Expressions for CFT and RCFT Bridge Components

Develops an improved, more accurate method of predicting shear resistance and deformation of circular, concrete-filled steel tubes (CFT) and concrete-filled tubes with internal reinforcement (RCFT) subjected to large shear stress. This method is expected to allow for reductions in the size of the CFT and RCFT members resulting in significant cost savings, and improvement in the seismic performance of pile and drilled shaft foundations.

RESEARCH TEAM: BIJAN KHALEGHI | LU SAECHAO | CHARLES ROEDER (UW) & DAWN LEHMAN (UW)
SCHEDULED COMPLETION: 2016

Risk Assessments and Retrofit Mitigation Estimate Study for Low Vertical Clearance Truss Bridges

Gathers data on all truss bridges in the state's inventory that have vertical clearances below the minimum required for state highways. The structures will be analyzed for potential mitigation, including retrofit, and will be prioritized based on risk. Scoping level cost estimates will be developed for each structure identified as requiring a retrofit. Develops a final report to be used for future programming of retrofit projects aimed at addressing structure. The study results will identify the most vulnerable truss bridges that have the highest risk for an oversized vehicle impact.

RESEARCH TEAM: GEOFF SWETT | LU SAECHAO | WSDOT IN HOUSE PROJECT
SCHEDULED COMPLETION: 2016

Seismic Performance of SMA/ECC Columns of SR 99 Bridge Structure

Evaluates the use and performance of innovative materials such as Nickel-Titanium shape memory alloy (SMA) bars and engineered cementitious composites (ECC) specific to the SR 99 bridge piers. Research will determine the seismic performance of the piers and the bridge under different intensities of earthquakes, representing the seismicity of the bridge's construction site. Funding is provided through a grant from the Federal Highway Administration (FHWA) program on Innovative Bridge Research and Deployment (IBRD).

RESEARCH TEAM: BIJAN KHALEGHI | LU SAECHAO | M. SAIIDI, UNIVERSITY NEVADA, RENO
SCHEDULED COMPLETION: 2016

3D Numeric Evaluation of Seismic Forces on Bridge Abutments

Develops and validates a design methodology that take into consideration the 3D effects to estimate earthquake-induced lateral spreading forces in embankments using 3 D technology and modeling.

RESEARCH TEAM: TONY ALLEN | LU SAECHAO | PEDRO ARDUINO (UW)
SCHEDULED COMPLETION: 2016

Liquefaction-Induced Downdrag on Shafts/Piles

Investigates the liquefaction-induced settlement on piles and drilled shafts, its implication on new design and needed remedial measures for existing structures.

RESEARCH TEAM: TONY ALLEN | BIJAN KHALEGHI | LU SAECHAO | BALASINGAM MUHUNTHAN (WSU)
SCHEDULED COMPLETION: 2016

MATERIALS

Mechanically Stabilized Embankments (MSE) Walls

Validates the stiffness metric applied in the equation for dictating the amount and type of backfill materials used for mechanically stabilized embankment walls. The results will be incorporated into the design specifications for the design of MSE walls.

RESEARCH TEAM: TONY ALLEN | LU SAECHAO | RICHARD BATHURST (ROYAL MILITARY COLLEGE OF CANADA)
SCHEDULED COMPLETION: ONGOING

Full-Scale Shake Table Testing to Evaluate Seismic Performance of Reinforced Soil Walls

Improves existing design procedures related to seismic demand and performance of earth retaining structures under strong ground motions. This is a collaborative, multistate research effort.

RESEARCH TEAM: TONY ALLEN | LU SAECHAO | JOHN MCCARTNEY (UC SAN DIEGO)
SCHEDULED COMPLETION: 2018

Performance Measures for Bituminous Surface Treatments (BST)

Looks at performance indicators for Bituminous Surface Treatment (BST), also known as chip seal roadways and develops trigger values that will indicate the end of service life and time for resurfacing.

RESEARCH TEAM: DAVE LUHR | LU SAECHAO | WSDOT IN HOUSE PROJECT

SCHEDULED COMPLETION: ONGOING

Determining Expected Life and Best Practices for Pavement Maintenance Treatments

Evaluates and develops best practices for pavement maintenance activities to create guidelines on how each maintenance treatment affects pavement life. The guidelines will be used by WSDOT to improve selection, planning, and completion of maintenance activities, which will result in longer pavement life and reduced life-cycle costs.

RESEARCH TEAM: JEFF UHLMEYER | DAVE LUHR | LU SAECHAO | WSDOT IN HOUSE PROJECT
SCHEDULED COMPLETION: 2018

Optimizing Hot Mix Asphalt (HMA) Performance for Climate Zones within Washington State

Determines why pavements in Washington's three general climate zones (western, eastern, and the mountain passes) are performing so differently and what we can do to improve pavement performance in each of the zones. The research will be used to revise asphalt pavement design and construction methods to increase the service life of HMA pavements.

RESEARCH TEAM: JEFF UHLMEYER | MARK RUSSELL | LU SAECHAO | HAIFANG WEN (WSU) | STEPHEN MUENCH (UW)
SCHEDULED COMPLETION: 2015

Development of a Strategic Pavement Study (SPS-2)

Provides a comprehensive assessment of all the surviving SPS-2 concrete pavement test sections to determine how and why they deteriorate or fail; and developing strategies to extend their service life.

RESEARCH TEAM: JEFF UHLMEYER | LU SAECHAO | NICHOLS CONSULTING ENGINEERS (NCE)
SCHEDULED COMPLETION: ONGOING

SR 290/Sullivan to Idaho Experimental Sections (Pervious Parking Strips)

Evaluates the short-term performance of pervious concrete on SR 290 in Spokane County. An "End of Construction" report will be written following completion of the project. In addition, a final report will be written at the end of the five-year annual inspection period summarizing performance characteristics and future recommendations for use of pervious pavements.

RESEARCH TEAM: JEFF UHLMEYER | LU SAECHAO | WSDOT IN HOUSE PROJECT
SCHEDULED COMPLETION: 2020

SAFETY

Two Lane Rural Road Prioritization/Safety Performance Factors

Creates analytical models to identify locations where low-cost safety improvements might be made as the best investment strategy with limited funding.

RESEARCH TEAM: JOHN MILTON | JON PETERSON | VENKY SHANKAR (PENN STATE UNIVERSITY)
SCHEDULED COMPLETION: 2015

Suburban/Urban Arterial Safety Performance Factors

Creates analytical models to identify safety performance factors that can be used in programming limited funds to have the best safety performances on suburban arterials.

RESEARCH TEAM: JOHN MILTON | JON PETERSON | VENKY SHANKAR (PENN STATE UNIVERSITY)
SCHEDULED COMPLETION: 2016

MAINTENANCE

Clear Roads

Improves winter highway maintenance through multistate research. Conducts structured field testing and evaluation across a range of winter conditions to assess the practical effectiveness, ease of use, optimum application rates, barriers of use and durability of innovative materials, equipment and maintenance methods.

RESEARCH TEAM: JAMES MORIN | DOUG BRODIN | DEBRA FLICK | MINNESOTA DOT ET AL
SCHEDULED COMPLETION: ONGOING

No Boundaries Roadway Maintenance Practices

Facilitates the implementation of promising innovations and technologies for roadway maintenance practices. This is a pooled fund study supported by nine states.

RESEARCH TEAM: JAMES MORIN | DOUG BRODIN | KIM LINSENMAYER, CTC ASSOCIATES
SCHEDULED COMPLETION: ONGOING

Avalanche Research Pool

Helping to define research topics and scope of work crucial to our avalanche control operations.

RESEARCH TEAM: JAMES MORIN | DOUG BRODIN | DAVID REEVES, COLORADO DOT
SCHEDULED COMPLETION: ONGOING

Implementing "Shake Cast" for Rapid Post Earthquake Response

Allows WSDOT to use the "Shake Cast" model to understand the impacts to Washington bridges following an earthquake..

RESEARCH TEAM: JOHN HIMMEL | DOUG BRODIN | LOREN TURNER, CALIFORNIA DOT
SCHEDULED COMPLETION: ONGOING

TRAFFIC

Maintenance of WSDOT/UW Travel Weather Information System

This project provides the system software and hardware for the UW to provide travel weather information for over 60,000 computer "hits" per day.

RESEARCH TEAM: JAMES MORIN | DOUG BRODIN | CLIFF MASS (UW)
SCHEDULED COMPLETION: 2017

Illumination for State Highways Including Crash Estimation and Modeling

This research will identify the correct level of highway illumination that is necessary to meet safety and operational goals. This may result in savings that allow for resources to be allocated to other uses.

RESEARCH TEAM: TED BAILEY | DOUG BRODIN | YINHAI WANG (UW)
SCHEDULED COMPLETION: 2015

Light-Emitting Diode (LED) Adaptive Roadway Lighting on Interstate 5

This project, funded by a federal grant, examines the use of adaptive lighting as a means of reducing operating costs in a field test on I-5.

RESEARCH TEAM: TED BAILEY | DOUG BRODIN | WSDOT IN HOUSE PROJECT
SCHEDULED COMPLETION: 2017

GOAL 2 - MODAL INTEGRATION

Optimize existing system capacity through better interconnectivity of all transportation modes

CONNECTIVITY

Use of Electronic Fare Transaction Data for Transportation Planning & Travel Demand Management

Uses modern data analytics on electronic fare transaction data in the Puget Sound Region to guide strategies for demand management and congestion reduction programs.

RESEARCH TEAM: JANICE HELMANN | JON PETERSON | MARK HALLENBECK (UW)
SCHEDULED COMPLETION: 2016

Optimizing Washington's Bicycle & Pedestrian Documentation

Develops a protocol and recommendations for WSDOT's community partners to help determine where automated bicycle/pedestrian counters should be located and how to conduct short-duration manual counts to maximize the accuracy in estimating annual average daily bicycle and pedestrian traffic.

RESEARCH TEAM: JON PETERSON | KRISTA NORDBACK (PORTLAND STATE UNIVERSITY) | MIKE LOWRY (UNIVERSITY OF IDAHO)
SCHEDULED COMPLETION: 2017

FREIGHT

Freight Demand Modeling and Data Improvement Strategic Plan

Collects the data necessary to accurately model state supply chains' behavioral responses to different scenarios aimed reducing freight emissions and their impacts.

RESEARCH TEAM: MATT PAHS | DOUG BRODIN | ANNE GOODCHILD (UW)
SCHEDULED COMPLETION: 2016

SHRP2 Wheat Supply Chain

Collects the data necessary to accurately model the state's wheat supply chains' behavioral responses to different state policy scenarios aimed at reducing freight emissions and their impacts.

RESEARCH TEAM: MATT PAHS | DOUG BRODIN | JEREMY SAGE (WSU)
SCHEDULED COMPLETION: 2015

Energy Transportation Corridors

Provides participating states with a mechanism to share information and experiences with each other and with experts in the field so that they are prepared to respond to energy sector developments affecting freight corridors.

RESEARCH TEAM: BARB IVANOV | DOUG BRODIN | TEXAS TRANSPORTATION INSTITUTE
SCHEDULED COMPLETION: 2017

Implementing the Routine Computation and Use of Roadway Performance Measures within WSDOT

Provides WSDOT with overall roadway performance measures, specifically oriented toward truck freight movements.

RESEARCH TEAM: MONICA HARWOOD | DOUG BRODIN | MARK HALLENBECK (UW)
SCHEDULED COMPLETION: 2017

TRAFFIC

HOV/Managed Use Lane Systems

Assembles regional, state, and local agencies and the Federal Highway Administration (FHWA) to manage roadway lanes as a tool to reduce congestion and optimize facility usage. This ongoing collaboration also identifies issues and develops strategies and projects to recommend solutions.

RESEARCH TEAM: MARK LETH | DOUG BRODIN
SCHEDULED COMPLETION: ONGOING

Transportation Management Center

Assembles regional, state, and local transportation management agencies and the FHWA to (1) identify human-centered and operational issues that are common among Transportation Management Center (TMC) operators and managers.

RESEARCH TEAM: VINH DANG | DOUG BRODIN AND PARTICIPATING AGENCIES.
SCHEDULED COMPLETION: ONGOING

Support and Align Operational and Demand Strategies and Business Processes with Planning and Programming within WSDOT

Helps change WSDOT culture into one that more effectively integrates Transportation System Management and Operations strategies into the planning and programming process in a multidisciplinary way.

RESEARCH TEAM: MONICA HARWOOD | DOUG BRODIN | MARK HALLENBECK (UW)
SCHEDULED COMPLETION: 2017

Drive Net Phase II

Drive Net was developed to be a stable, enterprise platform managed by dedicated staff at UW to provide the data analytics that are needed for reporting transportation performance measures, planning information, and other state and federal reports and analysis on the state's highway system.

RESEARCH TEAM: TED BAILEY | DOUG BRODIN | YINHAI WANG (UW)
SCHEDULED COMPLETION: 2016

Urban Mobility Study

Advances the state of the practice in the area of congestion measurement and congestion/mobility performance measurement. The participating states form a steering committee and contract with TTI to: 1) decide on the congestion reduction methods to include in the new methodology and which cities will be included in study; 2) continuously refine the Congestion Index to include multimodal operations or regional operational improvement programs; 3) maintain existing congestion measures; 4) add additional urban areas; and 5) respond to requests for mobility data.

RESEARCH TEAM: DANIELA BREMMER | DOUG BRODIN | TEXAS TRANSPORTATION INSTITUTE (TTI)
SCHEDULED COMPLETION: 2018

GOAL 3 - ENVIRONMENTAL STEWARDSHIP

Promote sustainable practices to reduce greenhouse gas emissions and protect natural habitat and water quality

SUSTAINABILITY

Near Road Air Quality Assessment

Addresses current and future challenges to WSDOT projects from new EPA requirements. Newly required near-road air quality standards have resulted in tighter emissions standards . WSDOT is leading this pooled fund program involving five states and FHWA.

RESEARCH TEAM: KARIN LANDSBERG | JON PETERSON | JIM LAUGHLIN | SONOMA TECHNOLOGY
SCHEDULED COMPLETION: 2018

Highway Stormwater Runoff – Steep Slopes Phase II

Examines steep slopes in western Washington to develop an acceptable standard for stormwater management that is cost effective and efficient in infiltrating highway runoff.

RESEARCH TEAM: ALEX NGUYEN | LU SAECHAO | TONY ALLEN | WSDOT IN HOUSE
SCHEDULED COMPLETION: ONGOING

Design Guidance and Long-Term Monitoring of Flow Deflection Structures

Investigates the characteristics of the SR 20 Skagit River flow-deflection structures, known as engineered logjams, in order to develop hydraulic design guidelines for in water-deflection structures. The ultimate goal of this research is to develop scour (removal of sediment) equations for gravel-bed rivers to be utilized in predicting scour that adversely affects bridges and adjacent highways in or near Washington rivers. These new in water structures also create new habitat for fish and other species.

RESEARCH TEAM: JIM PARK | LU SAECHAO | THANOS PAPANICOLAOU | UNIVERSITY OF TENNESSEE
SCHEDULED COMPLETION: 2017

USGS Flood Research

Updates the USGS Regression Equations (a tool for estimating peak flow in streams) for use in fish passage design and restoration work. This project is a collaboration with the U.S. Geological Survey (USGS) and the Washington State Department of Ecology (DOE).

RESEARCH TEAM: JULIE HEILMAN-SUAREZ | LU SAECHAO | MARK MASTIN (USGS)
SCHEDULED COMPLETION: 2016

Stormwater Treatment Sustainable Design Guidelines to Support the Washington State Ferries Terminal Design Manual

Produces sustainable design guidelines to aid in the development of WSF's terminal design manual. Addresses sustainable stormwater management practices that will specifically address the unique needs and requirements of ferry terminals.

RESEARCH TEAM: TOM BERTUCCI | LU SAECHAO | MICHAEL WOLCOTT (WSU)
SCHEDULED COMPLETION: 2016

Assessment of Lube Oil Management and Self-Cleaning Oil Filter Feasibility in WSF Vessels

Evaluate a new self-cleaning oil filter system to determine if this different oil management practice can reduce costs and environmental wastes on WSF vessels.

RESEARCH TEAM: SHANE KELLY | SHEILA HELGRATH | GREG HANSEN | JON PETERSON | LIV HASSELBACH (WSU) | QUIN LANGIT (WSU)
SCHEDULED COMPLETION: 2016

Electric Vehicle and Environmental Technical Support and Assistance

Provides support and assistance related to rule-making for WSDOT's EV infrastructure bank, program development and implementation, outreach and education, webinar and workshop planning and presentation, communication, research and analysis, environmental issues, market development, and/or program evaluation.

RESEARCH TEAM: TONIA BUEL | DOUG BRODIN | JIM JENSEN (WSU)
SCHEDULED COMPLETION: 2017

WILDLIFE AND SPECIES PROTECTION

Population and Flight Path Studies for Assessing Migration Measures to Minimize Impacts on Alkali Bees within the US 12 Phase 7 Project

Monitors bee populations in the vicinity of US 12. WSU is a partner in assessing the impacts and developing mitigation measures to counter reduced bee populations. This project is part of the US 12 compliance monitoring.

RESEARCH TEAM: MARK NORMAN | JON PETERSON | DOUGLAS WALSH (WSU)
SCHEDULED COMPLETION: 2016

Pile Driving Noise Attenuation Experiments

This field test of will drive experimental construction piles designed to attenuate underwater noise impacts to protected marine species and mammals in the Puget Sound. The double walled pile and the mandrel tip piles have achieved noise attenuation significantly below the regulatory thresholds . Constructability will be tested at the Vashon Ferry terminal reconstruction project.

RESEARCH TEAM: MARION CAREY | JIM LAUGHLIN | RICK HUEY | TOM BERTUCCI | JERI BERNSTEIN | MARK GAINES | RHONDA BROOKS | JON PETERSON | PER REINHALL (UW) | PETER DAHL (UW)
SCHEDULED COMPLETION: 2016

1-90/Snoqualmie Pass Wildlife Monitoring

Monitoring areas of I-90 by Central Washington University to identify wildlife populations and crossings at the interstate to identify mitigation measures.

RESEARCH TEAM: MARK NORMAN | JON PETERSON | STEVE WAGNER | KRIS ERNEST | PAUL JAMES (CWU)
SCHEDULED COMPLETION ONGOING

Application Tool for Assessing Wildlife Passage

Develops a digital Passage Assessment System for a hand-held device (IPad). This system will help in assessing existing bridges and culverts for safe wildlife crossing opportunities and storing the information for planning purposes. WSDOT is leading a pooled fund program involving two states.

RESEARCH TEAM: MARION CAREY | KELLY MCALLISTER | JON PETERSON | ZERION SOFTWARE, INC
SCHEDULED COMPLETION: 2015

Effectiveness of a Detecting System to Prevent Wildlife-Vehicle Collisions

Installs a detection system that detects elk and triggers a flashing light system to warn drivers. Washington has several problem areas where collisions with elk create risk for motorists. The device has the capability to collect data, which will be analyzed over a two year period to evaluate the system's effectiveness in reducing elk/vehicle collisions.

RESEARCH TEAM: KELLY MCALLISTER | JON PETERSON
SCHEDULED COMPLETION: 2017

GOAL 4 - ORGANIZATIONAL STRENGTH

Support a culture of multi-disciplinary teams, innovation and people development through training, continuous improvement and Lean efforts

BEST PRACTICES

Library Connectivity

Improves access to information resources from other transportation organizations and helps to reduce costs through bulk subscriptions and interagency sharing agreements.

RESEARCH TEAM: KATHY SZOLOMAYER | MICHEL WENDT | ANDREW POULTRIDGE
SCHEDULED COMPLETION: ONGOING

Transportation Research Program Management Database

WSDOT is leading an examination of best practices in research management with several other state DOT's so that new ways to manage research projects can be achieved.

RESEARCH TEAM: LENI OMAN | STEVE HANSON | JON PETERSON
SCHEDULED COMPLETION: 2016

Practical Solutions

This federal grant provides resources to uses LEAN methodology to streamline processes and knowledge management practices for selected transportation project development and management.

RESEARCH TEAM: LENI OMAN | STEVE HANSON | JON PETERSON
SCHEDULED COMPLETION: 2016

CONTINUOUS IMPROVEMENT

Commute Trip Reduction (CTR) Survey Processing Data Capturing and Reporting

The CTR Law requires participating worksites to measure employee commute behavior every two years to determine their progress toward CTR goals. The UW processes the survey responses so that data may be analyzed on various mobility options.

RESEARCH TEAM: MICHAEL WANDLER | JON PETERSON | DEBORAH SMITH (UW)
SCHEDULED COMPLETION: ONGOING

Western Alliance for Quality Transportation Construction

Supports the development and refinement of a training and qualification program for construction inspection and materials design technicians by the Western Alliance for Quality Transportation Construction (WAQTC), a cooperative technology transfer effort of multiple states and FHWA.

RESEARCH TEAM: CHRIS CHRISTOPHER | LU SAECHAO | BERNIE KUTA
SCHEDULED COMPLETION: ONGOING

Highway Safety Manual Implementation (HSM).

Provides opportunities for WSDOT to benefit from late breaking innovations and changes that improve traveler safety. WSDOT participates by offering expertise and resources towards HSM development, testing and implementation.

RESEARCH TEAM: JOHN MILTON
SCHEDULED COMPLETION ONGOING

COLLABORATION

Western States Rural Transportation Consortium (WSRTC)

Promotes innovative partnerships, technologies, and educational opportunities to facilitate and enhance safe, seamless rural travel throughout the western United States. The WSRTC also provides a collaborative mechanism to leverage research activities in a coordinated manner to respond to rural transportation issues among western states related to technology, operations, and safety.

RESEARCH TEAM: RON VESSEY | DOUG BRODIN | DOUG GALARUS (MONTANA STATE UNIVERSITY)
SCHEDULED COMPLETION: ONGOING

Roadside Safety Pooled Fund Program

WSDOT leads a collaboration with 12 other states and FHWA to identify research on roadside safety features and to collaborate on emerging federal policy and standards effecting traveler safety.

RESEARCH TEAM: JEFF PETTERSON | RHONDA BROOKS | ROGER BLIGH (TEXAS TRANSPORTATION INSTITUTE)
SCHEDULED COMPLETION ONGOING

Western Maintenance Partnership

Provides a highly effective forum for the exchange of information, techniques, policies and strategies for the maintenance of the highway system. Eight states are participating.

RESEARCH TEAM: JAMES MORIN | DOUG BRODIN | DAVID STEVENS, UTAH DOT ET AL
SCHEDULED COMPLETION: ONGOING

INTERNSHIPS

Northwest Region Traffic Management Center Intern Program

Supports internships for UW students at the NW Region TMC who, under the supervision of WSDOT engineers, operate the freeway systems in central Puget Sound by controlling ramp meters, assisting in incident identification with closed circuit television cameras, and informing the traveling public with variable message signs, highway advisory radio and traffic condition update reports.

RESEARCH TEAM: CHRIS THOMAS | DOUG BRODIN | SCOTT RUTHERFORD (UW)
SCHEDULED COMPLETION: 2017

Toll Division Intern Program

Supports internships for UW students who, under the supervision of WSDOT engineers, assist in collecting, storing and processing data related to the operation of the WSDOT toll facilities.

RESEARCH TEAM: TYLER PATTERSON | DOUG BRODIN | SCOTT RUTHERFORD (UW)
SCHEDULED COMPLETION: 2017

Research Intern Program

College students are hired to conduct short term research projects for various programs throughout WSDOT. The program provides professional work experience for students interested in transportation and also provides WSDOT managers with the results of research to assist with collecting and analyzing information.

RESEARCH TEAM: RHONDA BROOKS | DOUG BRODIN | LU SAECHAO | JON PETERSON
SCHEDULED COMPLETION ONGOING

GOAL 6 - SMART TECHNOLOGY

Improve information system efficiency to users and enhance service delivery by expanding the use of technology

MAINTENANCE

Efficiency and Effectiveness of Winter Snow and Ice Control Using Tow Plow Technology

Determines whether a tow plow is as effective as our current plowing operations.

RESEARCH TEAM: JAMES MORIN | DOUG BRODIN | WSDOT IN HOUSE PROJECT
SCHEDULED COMPLETION: 2016

TRAFFIC

Research, Development, and Deployment of System Operations Applications of Vehicle Infrastructure Integration (VII)

Develops and evaluates Connected Transportation Systems large-scale, system-level-operations applications; independently researches and addresses issues that will affect the deployment of Connected Vehicle systems by state and local transportation agencies; supports AASHTO's Strategic and Deployment Plans; and supports USDOT's Connected Vehicles Programs and Initiatives.

RESEARCH TEAM: BILL LEGG | DOUG BRODIN
SCHEDULED COMPLETION: ONGOING

Connected Vehicles and Smart Cities

Serves as a pilot study in the application of Connected Vehicles technology, and will support WSDOT's efforts to transition to the future of data infrastructure.

RESEARCH TEAM: BILL LEGG | DOUG BRODIN | YINHAI WANG (UW)
SCHEDULED COMPLETION: TBD

Evaluation of Smart Technology

WSDOT needs a tool to streamline the screening and evaluation of new, smart technologies. A tremendous amount of new products from smart phone-based applications, radio communication devices for use in connected vehicle environments, and host of data collection devices are continuously in development. This research effort will explore an enterprise approach to considering the adoption of new technology into work practices.

RESEARCH TEAM: TED BAILEY | DOUG BRODIN | YINHAI WANG (UW)
SCHEDULED COMPLETION: TBD

Northwest Passage

Coordinates, develops and deploys Intelligent Transportation Systems (ITS) along the I-90 and I-94 corridor. The long-range goal of the study is to utilize effective methods for sharing, coordinating, and integrating traveler information across the state borders and to influence ongoing standards development. This is a multi-state cooperative program.

RESEARCH TEAM: BILL LEGG | DOUG BRODIN
SCHEDULED COMPLETION: ONGOING

Traffic Office Support

Provides analytical assistance and data resources to the various WSDOT groups at the request of the Headquarters Traffic Office. The assistance will take the form of analytical results (data, graphs, presentation materials, and reports) produced by TRAC-UW.

RESEARCH TEAM: TED BAILEY | DOUG BRODIN | MARK HALLENBECK (UW)
SCHEDULED COMPLETION: 2017

USER FEES

Western Road Usage Charging Consortium (WRUCC)

Conducts collaborative research and explores development of a potential new transportation funding method that would collect road usage charge (RUC) from drivers based on actual road usage. Goals of the WRUCC are to foster competition providing RUC services allowing for motorist choice; compatibility with readily-available and affordable consumer products and technologies (such as smartphones, in-vehicle navigation systems, and other data-dependent vehicle technologies); and achieve the primary purpose of collecting taxes to fund roadway maintenance and improvements, and allow for each state's unique needs.

RESEARCH TEAM: TONIA BUELL | DOUG BRODIN

SCHEDULED COMPLETION: ONGOING

Mileage Based User Fees (MBUF)

Creates opportunities to learn and begin coordinating efforts with respect to the MBUF concept, a user-based taxing system that charges drivers for the miles they drive on the roadway system.

RESEARCH TEAM: TONIA BUELL | DOUG BRODIN

SCHEDULED COMPLETION: ONGOING

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